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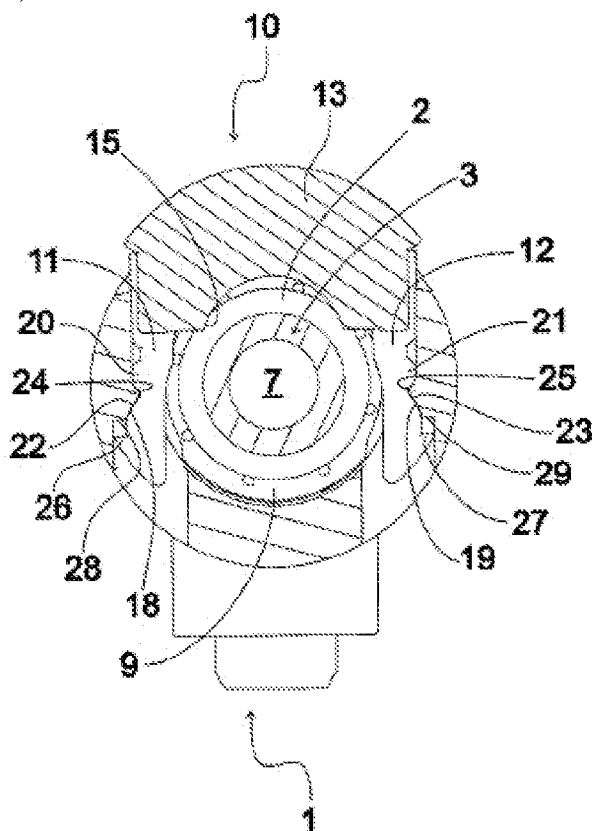
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(54) **Title:** COUPLING



(57) **Abstract:** The invention relates to a coupling comprising a receiving part (1), for receiving an insert (3) formed with a retaining ring (2), and a locking element (10) having two arms (11, 12) and a retaining portion (14), said locking element (10) fitting into a receiving space (7) of the receiving part (1) and movable between a raised and a pushed-in position. A lifting bevel (16) is formed on the locking element (10) and cooperates with the retaining ring (2) of an insert (3) in such a way that the locking element (10) can be moved from the pushed-in position to the raised position. The coupling also comprises a prelock assembly (15) and a pullback assembly (18, 19, 22, 23), which cooperate in such a way that when the retaining ring (2) is moved in the insertion direction into position behind the lifting bevel (16), the prelock assembly (15) engages behind the retaining ring (2) and the pullback assembly (18, 19, 22, 23) shifts the locking element (10) into a prelocked position. High reliability of assembly is achieved in this manner.

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*For an explanation of the two-letter codes and other abbreviations, see the notes ("Guidance Notes on Codes and Abbreviations") provided at the beginning of each regular edition of the PCT Gazette.*

### Coupling

The invention concerns a coupling according to the preamble of Patent Claim 1.

Such a coupling is known from DE 199 46 260 C1. The previously known coupling comprises a receiving part for receiving an insert formed with a retaining ring. A locking element having two arms and a retaining portion is also present, which locking element can be fitted into a receiving space in the receiving part and moved perpendicularly to an insertion direction of the insert between a raised position and a pushed-in position. By this means, when the locking element is in the pushed-in position, the insert is protected against inadvertently slipping out of the receiving part by the engagement of the retaining portion behind the retaining ring. However, it is possible for the locking element to be in the pushed-in position without the insert being properly secured.

The object of the invention is to specify a coupling of the aforesaid kind that is characterized by high assembly reliability.

This object is achieved with an inventive coupling of the aforesaid kind having the characterizing features of Patent Claim 1.

The fact that in the inventive coupling, when an insert is inserted, the locking element moves from the pushed-in position into the raised position due to cooperation between the lifting bevel and the retaining ring of an insert, and when the insert is properly arranged in the inventive coupling, the locking element is shifted by the pullback assembly into a prelocked position in which the prelock assembly engages behind the retaining ring to keep the insert from shifting the locking element into the pushed-in position, without which measure the insert would be forced back out by the action of the bevel on the retaining ring, thereby shifting the locking element from the raised position into the pushed-in position, makes for reliable assembly, which is very important especially in the case of assembly-line work involving the tightly synchronized connection of inventive couplings to inserts.

Further suitable configurations of the invention are the subject matter of the dependent claims.

Additional suitable configurations and advantages will become apparent from the following description of a preferred exemplary embodiment of the invention in conjunction with reference to the figures of the drawing. Therein:

Fig. 1 is a partially cut-away perspective view of an exemplary embodiment of an inventive coupling comprising a receiving part and a locking element, the latter being in a pushed-in position, plus an insert that is to be fitted into the inventive coupling,

Fig. 2 is a partially cut-away perspective view of the exemplary embodiment according to Fig. 1, with an insert inserted into the inventive coupling and the locking element in a prelocked position,

Fig. 3 is a cross section, taken in the region of a prelock assembly, of the exemplary embodiment according to Fig. 1 in the arrangement illustrated in Fig. 2,

Fig. 4 is a partially cut-away perspective view of the exemplary embodiment according to Fig. 1, with an insert inserted into the receiving part and the locking element in a pushed-in position, and

Fig. 5 is a cross section of the exemplary embodiment according to Fig. 1 in the arrangement illustrated in Fig. 4.

Figure 1 is a partially cut-away perspective view of an exemplary embodiment of an inventive coupling. The coupling of Fig. 1 comprises a receiving part 1, which can be connected by an end (not illustrated in Fig. 1) to a line of a fluid conducting system. To sealingly connect the inventive coupling to an insert 3 formed with a retaining ring 2, a first sealing ring 4, a second sealing ring 5 and an intermediate ring 6 disposed between sealing rings 4, 5 are provided in a receiving space 7 of receiving part 1. A spacer ring 9 disposed adjacent the face of second sealing ring 5 that is oriented toward the insertion end 8 serves to hold spacer [sic] rings 4, 5 and intermediate ring 6 between the side of receiving space 7 facing away from insertion end 8 and a locking element 10 of the inventive coupling.

Locking element 10 is displaceable in receiving part 1 between a pushed-in position, shown in Fig. 1, and a raised position, and comprises a first arm 11 and a second arm 12, which are disposed opposite each other and project by an inner portion into receiving space 7. Also formed on a transverse portion 13 extending between arms 11, 12 is a retaining portion 14, which, as explained more thoroughly

hereinbelow, engages behind retaining ring 2 when insert 3 is properly inserted, locking element 10 being in a fully pushed-in position and insert 3 being in the properly inserted position. It can also be seen from Fig. 1 that formed on locking element 10 is a projection 15 of a prelock assembly, which projection extends into receiving space 7 and comprises a lifting bevel 16 that slopes radially upward and outward in the direction of insertion end 8, oppositely to an insertion direction of insert 3.

Figure 2 is a partially cut-away perspective view of the exemplary embodiment according to Fig. 1, with insert 3 inserted in the inventive coupling and locking element 10 in a prelocked position which it assumes by way of the raised position. The prelocked position is attained by the fact that during the insertion process, retaining ring 2, on butting against lifting bevel 16, which extends radially inward in the insertion direction, moves locking element 10 radially outward perpendicularly to the insertion direction into a raised position until retaining ring 2 has moved past projection 15 and locking element 10 is in the prelocked position. It can also be seen from Fig. 2 that projection 15 has on its face confronting lifting bevel 16, which is its rear face as viewed in the direction of insertion of insert 3, a driving-in bevel 17 that extends radially upward and outward in the insertion direction.

Figure 3 shows the exemplary embodiment of Fig. 1 in the arrangement illustrated in Fig. 2, in a cross section taken in the region of projection 15 of the prelock assembly, looking at the – from the standpoint of the direction of insertion – rear portion of the receiving space 7. It can be seen from Fig. 3 that in the prelocked position, projection 15 engages behind retaining ring 2 and insert 3 is thereby protected in the prelocked position against inadvertently being pulled out of receiving part 1.

It is also apparent from Fig. 3 that each of arms 11, 12 is provided on its radially outer face with a pullback bevel 18, 19 of a pullback assembly and with a click-stop projection 20, 21, which cooperate with counterbevels 22, 23 of the pullback assembly that are formed on receiving part 1 and are each disposed opposite an assigned pullback bevel 18, 19, or with snap-in projections 24, 25 of the pullback assembly that are formed on receiving part 1, to counteractively maintain locking element 10 in the prelocked position by generating, on the one hand, a force counteracting an extracting force acting to shift locking element 10 from the prelocked position into the raised position, and on the other hand, a radially inward force acting to shift the locking element from the prelocked position into the pushed-in position.

Also formed on each arm 11, 12 is a radially outwardly projecting locking nose 26, 27, which in the prelocked position illustrated in Fig. 3 is disposed at some distance from locking shoulders 28, 29 formed

on receiving part 1. When locking element 10 is in the fully raised position, locking noses 26, 27 butt against locking shoulders 28, 29 and prevent locking element 10 against being detached from receiving part 1 when insert 3 is removed from receiving part 1 as a result of the application of forces that do not act radially inwardly on arms 11, 12, in order to deliberately remove locking element 10 from receiving part 1.

Figure 4 is a partially cut-away perspective view of the exemplary embodiment according to Fig. 1 with an insert 3 properly inserted in receiving part 1 to sealingly connect the inventive coupling and insert 3, and with locking element 10 in the pushed-in position. When locking element 10 is shifted from the prelocked position into the pushed-in position, insert 3 is driven by the action of drive-in bevels 17 (not visible in the representation of Fig. 4) on retaining ring 2 in the insertion direction into receiving space 3 until retaining portion 14 engages behind retaining ring 2.

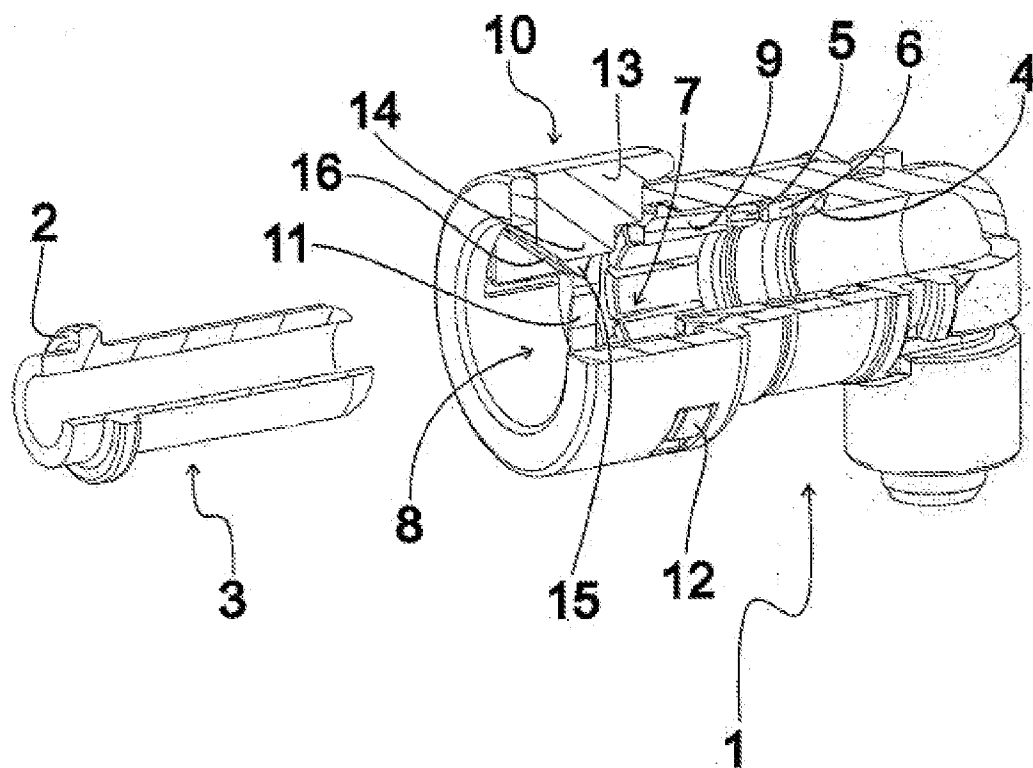
Figure 5 is a cross section of the exemplary embodiment according to Fig. 1 in the arrangement shown in Fig. 4. It can be seen from Fig. 5 that, compared to the arrangement depicted in Fig. 3, the click-stop projections 20, 21 formed on locking element 10 are now on the other side of snap-in projections 24, 25 in the insertion direction of locking element 10, and protect locking element 10 against inadvertently being shifted from the pushed-in position into the prelocked position.

## PATENT CLAIMS

1. A coupling comprising a receiving part, for receiving an insert formed with a retaining ring, and a locking element having two arms and a retaining portion, said locking element fitting into a receiving space of said receiving part and movable perpendicularly to an insertion direction of said insert between a raised position and a pushed-in position, **characterized in that** formed on said locking element (10) is a lifting bevel (16) that cooperates with the retaining ring (2) of an insert (3) in such a way that said locking element (10) can be moved from the pushed-in position to the raised position, and in that a prelock assembly (15) and a pullback assembly (18, 19, 22, 23) are present, which cooperate in such a way that when said retaining ring (2) is moved in the insertion direction into position behind said lifting bevel (16), said prelock assembly (15) engages behind said retaining ring (2) and said pullback assembly (18, 19, 22, 23) shifts said locking element (10) into a prelocked position between the pushed-in position and the raised position.
2. The coupling as in claim 1, characterized in that said prelock assembly is a projection (15) extending into said receiving space (7) and in that said lifting bevel (16) is formed on said projection (15).
3. The coupling as in claim 1 or claim 2, characterized in that said pullback assembly comprises pullback bevels (18, 19) formed on said locking element (10) and a counterbevel (22, 23) formed on said receiving part (1), which cooperate to generate a force directed oppositely to a movement of said locking element (10) from the prelocked position to the raised position.
4. The coupling as in one of claims 1 to 3, characterized in that said locking element (10) comprises a click-stop projection (20, 21) and in that said receiving part (1) is formed with a snap-in projection (24, 25), each of said click-stop projections (20, 21) being disposed, in the prelocked position and in the pushed-in position, to one side of a respective click-stop projection (20, 21)<sup>1</sup> and adjacent thereto.

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<sup>1</sup> TRANSLATOR'S NOTE: Sic. "Snap-in projection (24, 25)" must have been intended, either here or at the beginning of the clause (German *Raststufenvorsprung* ["click-stop projection"] vs. *Rastvorsprung* ["snap-in projection"]) although it must be acknowledged that the numerals are correct for the element as stated).

**Fig. 1**



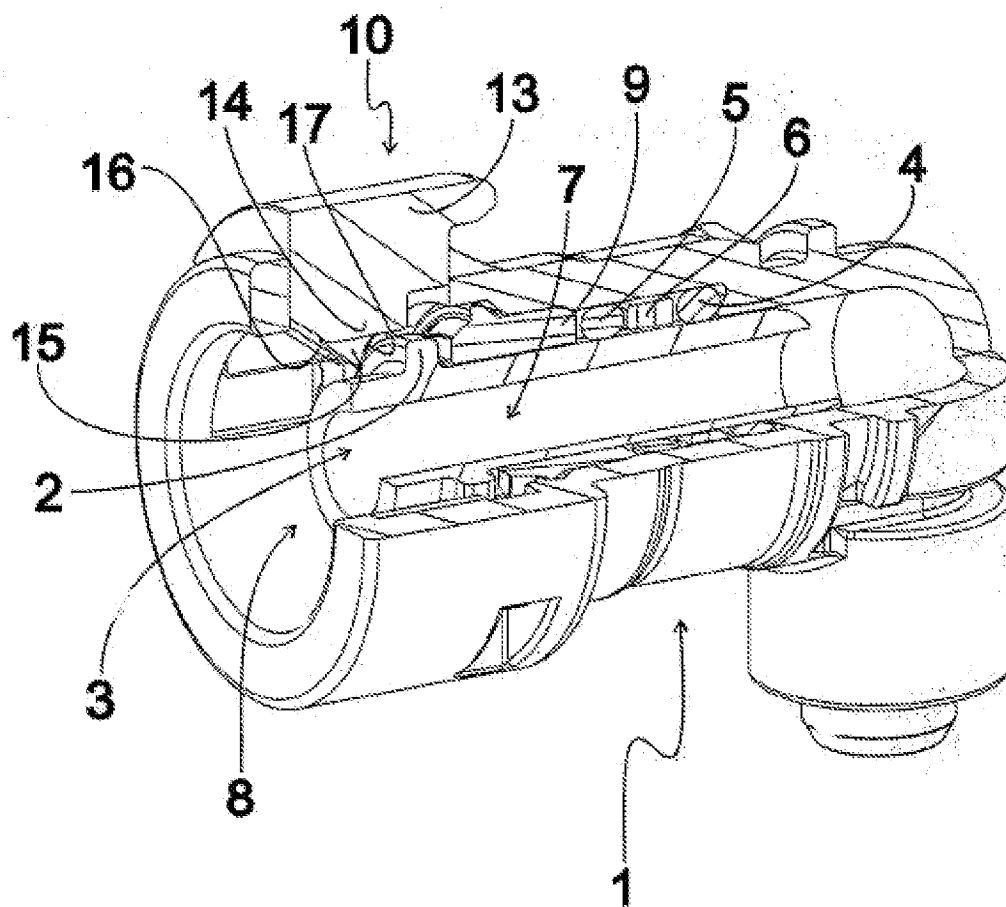


Fig. 2

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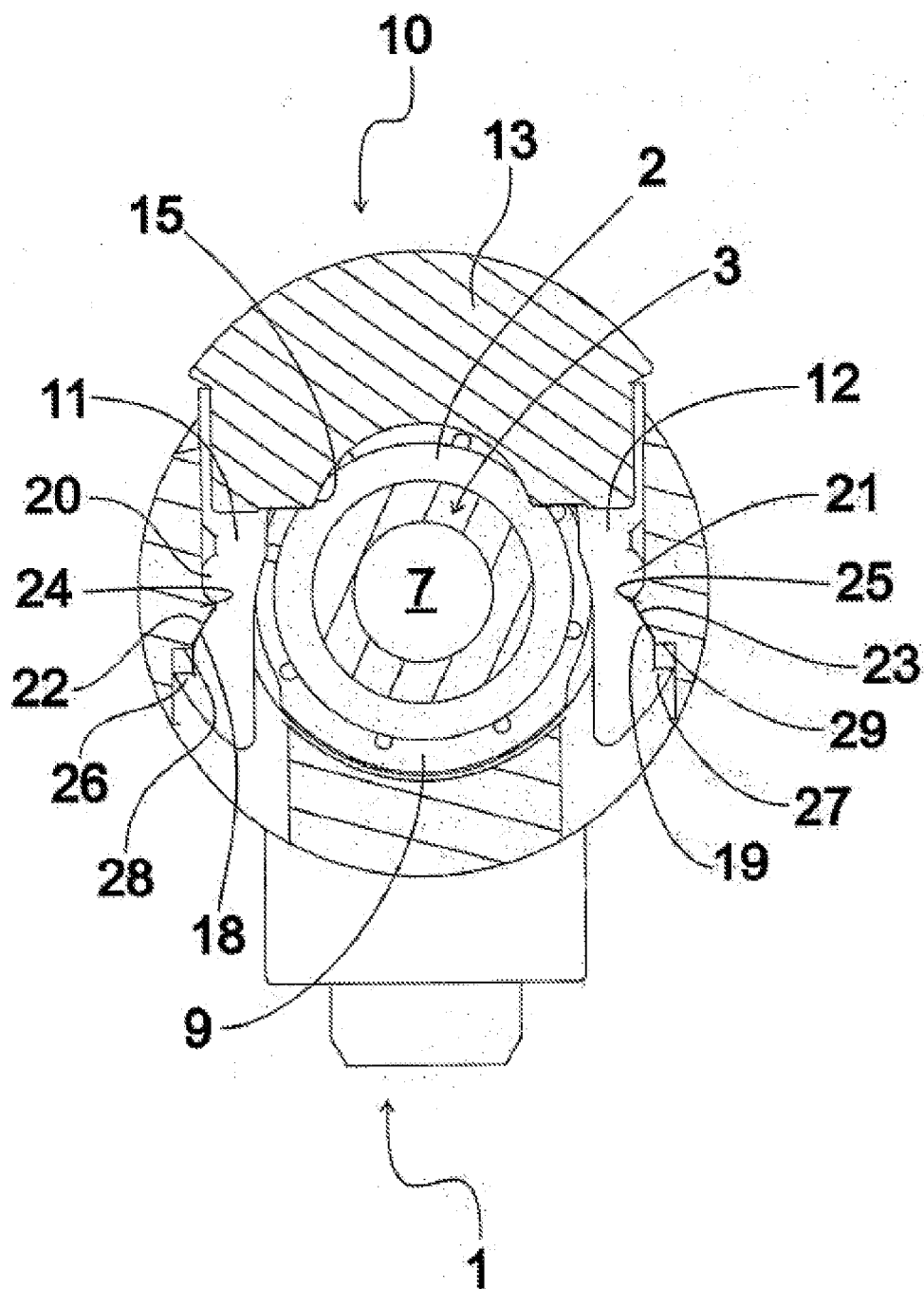
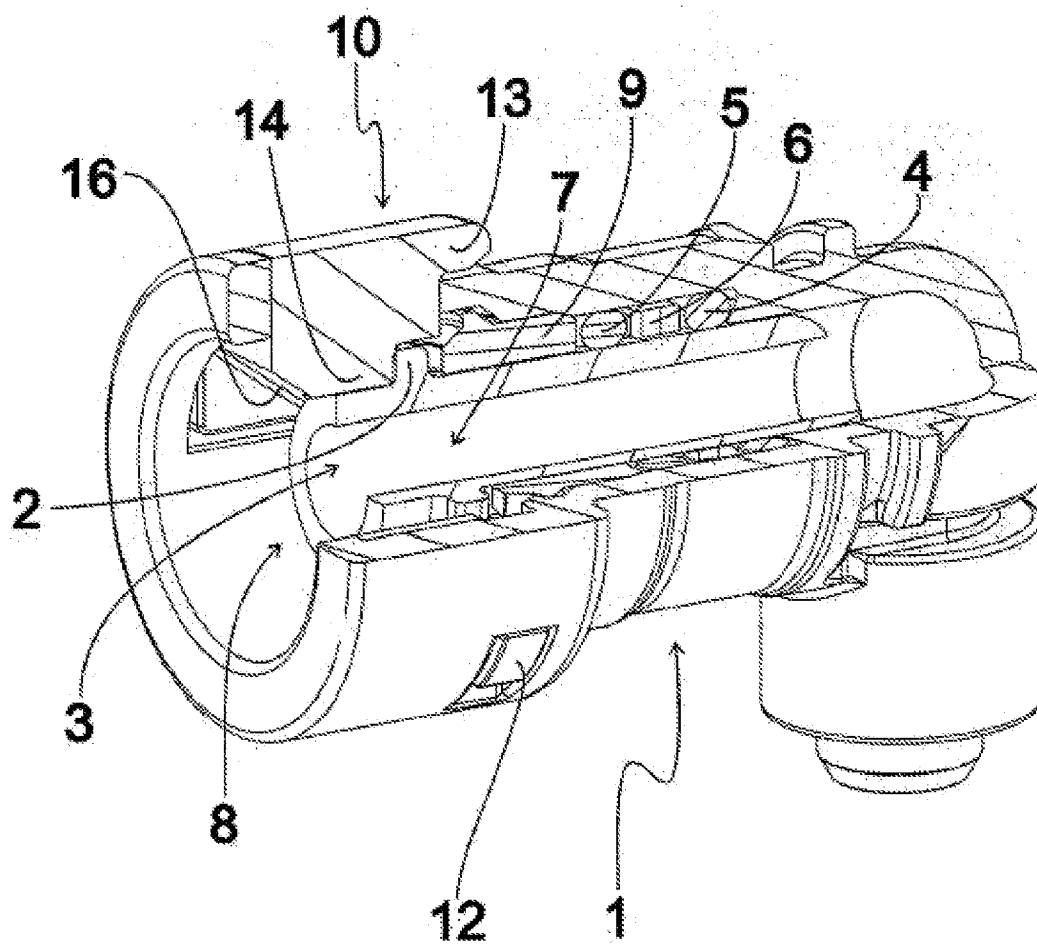


Fig. 3

**Fig. 4**

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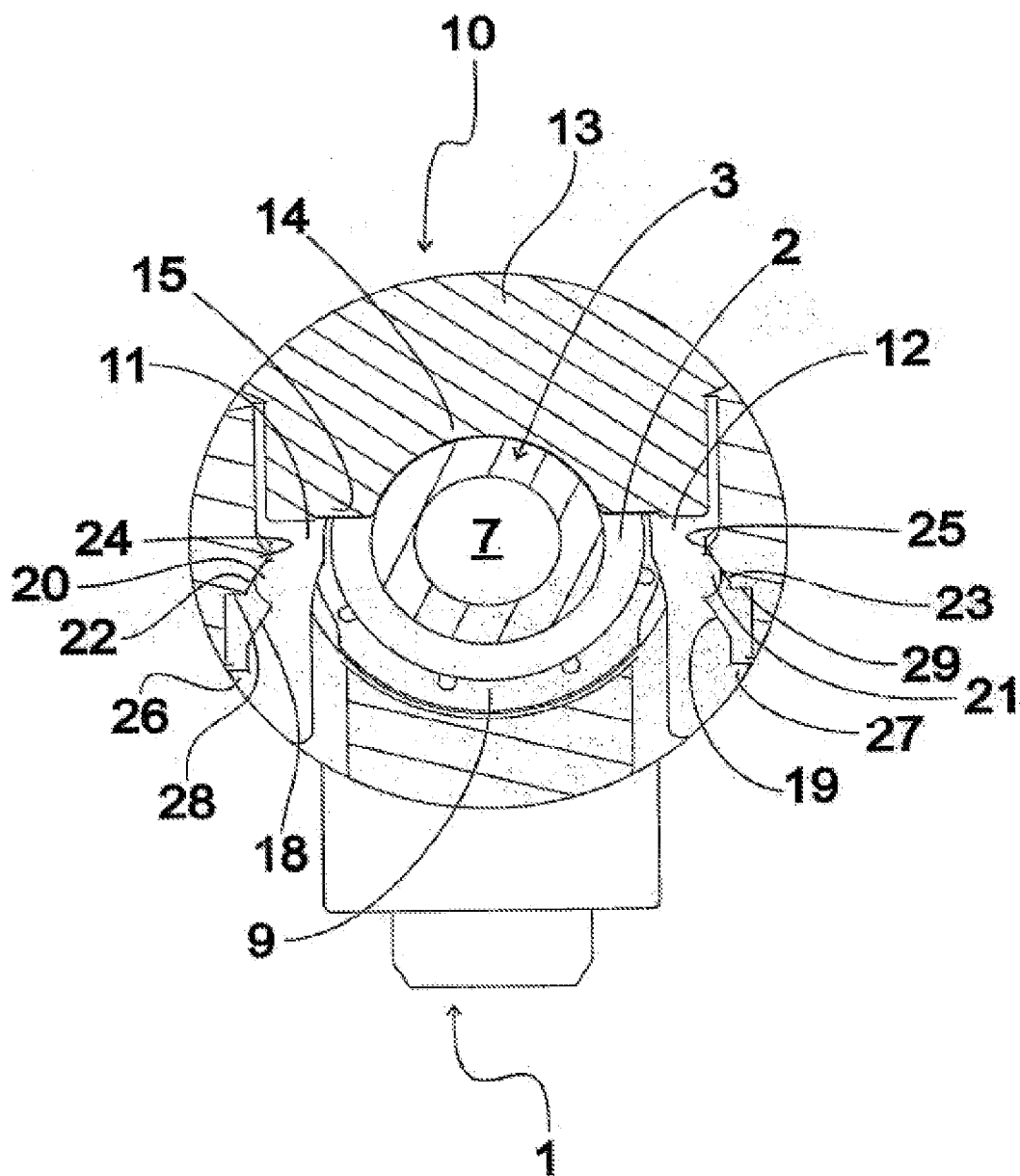


Fig. 5